

**METHOD AND APPARATUS FOR ICONIFYING
AND AUTOMATICALLY DIALING TELEPHONE NUMBERS
WHICH APPEAR ON A WEB PAGE**

BACKGROUND OF THE INVENTION

TECHNICAL FIELD

5 The invention relates to electronic communication systems. More particularly,
the invention relates to a system for recognizing and accessing telephone
numbers from databases distributed over an electronic network.

DESCRIPTION OF THE PRIOR ART

10 Electronic networks are increasingly being used to store and distribute a variety
of data. Examples of such electronic networks include the Internet, and intranet
systems. For example, a World Wide Web (Web) page may include text,
graphical displays, video displays, animation, and sounds.

15 The Web is usually accessed via telephone lines by a modem-connected
computer. However, the Web may also be accessed through other devices,
including personal data assistants, fax machines, and Internet-capable
telephones. One telephone that provides Web access is described in M.
Valentaten, B. Moeschen, Y. Friedman, Y.-T. Sidi, Z. Blkowsky, Z. Peleg , *Multi-
20 Mode Home Terminal System that Utilizes a Single Embedded General
Purpose/DSP Processor and a Single Random Access Memory*, U.S. Patent
No. 5,259,940 (October 5, 1993).

A Web page is encoded in Hypertext Markup Language (HTML). An HTML document is a plain-text (ASCII) file that uses tags to denote the various elements in the document. An element may include an attribute, which is additional information that is included between tags.

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HTML can be used to link text and/or images, such as icons, to another document or section of a document. The user activates a link by clicking on it, and the linked database is directly accessed. Links are used to access related information, or to contact a person or entity. However, information on a Web page must have the requisite HTML tags to be an active link.

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Web pages often contain additional information such as telephone numbers. These phone numbers appear as informational numbers, for example, for customer service, marketing materials, further information, or for advertising. With the expansion of the Web, Web pages that specialize in providing phone numbers are being created. Such Web pages include directory services, white pages , and yellow pages.

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However, these phone numbers are provided on the Web as text. HTML cannot be used to dial a telephone number over the Internet. Rather, the user must first search the text to locate a phone number. This search may be by visual inspection or by using a search engine to find a particular reference and its associated phone number. To access a number, the user must manually dial the number, or manually input the number into an automatic dialing program.

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Furthermore, access to the Web is typically via a telephone line. If the user has only one telephone line, the user must disconnect from the Web before the phone number can be dialed. The prior art process for obtaining and calling a

phone number listed on the Web is neither time nor cost effective, especially in a business environment.

5 It would therefore be an advantage to provide a system for recognizing telephone numbers from the World Wide Web. It would be a further advantage if such system if the system iconified telephone numbers to permit automatic dialing of a selected number. It would be yet another advantage if such system organized such telephone numbers to facilitate locating a desired number.

10 SUMMARY OF THE INVENTION

The invention provides a method and apparatus for recognizing and accessing telephone numbers that are contained within a Web page. The telephone numbers are iconified to permit automatic dialing of a selected number.

15 The preferred embodiment of the invention is adapted for use with a Web telephone. However, alternative embodiments of the invention are adapted for use with any Internet access device. In the preferred embodiment of the invention, either the server that controls Internet access or a client parses the HTML code of an accessed Web page. A parsing algorithm applied to the text in the HTML document pattern-recognizes telephone numbers having a standard format, such as United States numbers or international phone numbers.

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25 Coding is added to iconify recognized telephone numbers. The invention may be configured to iconify all pattern-recognized telephone numbers, or to iconify only those numbers meeting specific criteria. An iconified telephone number is identified on the Internet-capable telephone screen by means including a button surrounding the number, font appearance, underlining, or highlighting.

Iconified telephone numbers may be either automatically or manually stored in an address book for later use.

To call a phone number, the user selects the icon, for example, by clicking on it.

5 The Internet-capable phone determines how to initiate the call. If the user has a two-line phone, the Internet-capable telephone initiates a telephone call to the selected number.

10 If the user has a one-line phone, the Internet-capable telephone determines whether the line is available for a call. If the line isn't currently being used, the Internet-capable telephone initiates a voice call to the selected number. However, if the user is connected to the Web, the Internet-capable telephone automatically disconnects from the Internet and initiates a voice call to the selected telephone number. At the conclusion of the telephone call, the
15 Internet-capable telephone may or may not automatically re-connect to the Web.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a flow chart of a method for recognizing and accessing telephone numbers according to the preferred embodiment of the invention;

Fig. 2 is a flow chart of an algorithm for recognizing telephone numbers according to the invention; and

Fig. 3 is a flow chart of a method for accessing telephone numbers according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

The invention provides a method and system for recognizing telephone numbers from a Web page. The telephone numbers are iconified to permit automatic dialing of a selected number.

Fig. 1 is a flow chart of a method for recognizing and accessing telephone numbers, according to the preferred embodiment of the invention. The preferred embodiment of the invention is adapted for use with the Web technique described above. (See U.S. Patent No. 5,250,940.) However, alternative embodiments of the invention are adapted for use with any Internet access device.

The server that controls Internet access for the I-Phone parses the HTML code of an accessed Web page (100). While parsing the HTML, the server examines the text in the HTML document. It should be appreciated that parsing may just as readily be performed on the Client instead of the server. Thus, the following discussion is provided for purposes of example and not as a limitation on the

scope of the invention. An algorithm is applied to this text to pattern-recognize telephone numbers (105). The algorithm is readily modified to recognize any telephone numbers having a standard format, such as United States numbers or international phone numbers.

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The layout is then rendered in a displayable form (110). In the preferred embodiment of the invention, the server (or the Client) converts the HTML layout to an equivalent of the HTML layout (115). Alternative embodiments of the invention do not convert the HTML layout, or convert the HTML to different browser formats.

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Where the parsing is performed by the server, the HTML page can be converted into different formats prior to being sent to clients, depending on the client's particular requirements. For example, an HTML page can be converted into formats accessible by a Web telephone, a cellular phone, or a personal digital assistant having a wireless phone. The files are sent to the user's Internet-capable telephone and the Web page is displayed on the telephone's screen (120). All previously-active links and graphical displays supported by the Internet-capable telephone are maintained in this display.

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As a part of the HTML conversion, coding is added to iconify recognized telephone numbers (125). The invention may be configured to iconify all pattern-recognized telephone numbers, or to iconify only those numbers meeting specific criteria. In this case, a restrictor is used to direct the pattern-recognition software to only recognize or to ignore certain area codes, not to iconify certain foreign-country telephone numbers, or to iconify only telephone numbers associated with specific text headings such as "Customer Support." In such case the number still appears on the screen display, but is not iconified.

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In the preferred embodiment of the invention, an iconified telephone number is identified on the Internet-capable telephone screen by a button surrounding the number. However, in alternative embodiments, the telephone number may be identified by different means, such as font appearance, underlining, or highlighting.

Fig. 2 is a flow chart of an algorithm for recognizing telephone numbers, according to the invention. A set of Picture Formats are developed for the patterns of phone numbers. While the software program is reading the HTML document, it reads the text of every character that it comes across and checks to see if the text is a number (200). If the character is non-numeric (225), HTML parsing continues. However, the identification of a number (205) triggers the pattern-recognition algorithm (210). The pattern-recognition algorithm sequentially checks the characters following the identified number to determine if they also are numbers. A series of consecutive numbers is cached (215) and then compared to the Picture Formats (220). A matching format indicates a telephone number.

Telephone numbers can include text, such as hyphens or parentheses, or spaces interspersed with numbers. The patterns in the Picture Formats are therefore defined by those text characters that can be before and in between numbers. Because some text characters void the pattern, the algorithm should take this into account (230). Thus, the algorithm can distinguish, for example, among parentheses surrounding an area code, parentheses surrounding a sentence, and a serial number containing both numbers and text characters.

The patterns in the Picture Formats are also defined by the length of the number string. For example, U.S. area codes are usually three digits, and prefixes are usually three digits, followed by four final digits.

The following is an example of an algorithm that supports U.S. phone numbers.
The algorithm looks for the following patterns:

5 'xxx*xxx';

 'x*xxx*xxx';

 'xxx**xxx*xxx'; and

10 'x**xxx**xxx*xxx';

where x represents a numeric digit, * represents one character, and **
represents either one or two characters, all of which can only be equal to "-", ")",
15 ".", or " ". There is a first character case that is omitted which is a "+" or a "(" .

Fig. 3 is a flow chart of a method for accessing telephone numbers, according to
the invention. To call a phone number, the user selects the icon by clicking on
it, or by another suitable selection method (300). The Internet-capable phone
20 makes the determination of how to initiate the call (305). If the user has a two-
line phone, the Internet-capable telephone initiates a telephone call to the
selected number (335).

If the user has a one-line phone (315), the Internet-capable telephone first
25 determines whether the line is available for a call. If the line is not currently
being used for another telephone call or to connect to the Internet (325), the
Internet-capable telephone initiates a voice call to the selected number (335).
However, if the user is connected to the Web (320), the Internet-capable

telephone automatically, and transparently, disconnects from the Internet session (330) and initiates a voice call to the selected telephone number.

5 The Internet-capable telephone recognizes the conclusion of the call and terminates the telephone call session (340). The Internet-capable telephone may then automatically, and transparently, re-connect to the Web (345). If desired, this feature may be a user-determined preference. In alternative embodiments of the invention, the Internet-capable telephone may be configured to re-connect to the Web only when directed to do so by the user.
10 The Internet-capable telephone is thus seamlessly integrated with the Web.

15 In one embodiment of the invention, the pattern-recognition software is configured to recognize identification. For example, telephone numbers directly following headings such as Technical Support or Sales are recognized and iconified. In one embodiment of the invention, the pattern-recognition algorithm is configured for use with an Internet Telephone directory. The user can then look up a telephone number in such a directory and directly dial the retrieved numbers from the Internet-capable telephone display screen.

20 In an alternative embodiment of the invention, iconified telephone numbers are stored in an address book for later use. For example, HTML tags in an Internet telephone directory that identify a record, e.g. including name and address, that can be added to an address book are recognized. These records can then be either automatically or manually added to the user's address book. In a manual
25 implementation, the Internet-capable telephone displays a button or other type of selection means that the user can select to store a record, including such information as name and address.

Although the invention is described herein with reference to the preferred embodiment, one skilled in the art will readily appreciate that other applications may be substituted for those set forth herein without departing from the spirit and scope of the present invention.

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For example, in the preferred embodiment of the invention, the translation from HTML is performed by the server. However, in alternative embodiments, the translation is performed by the Internet-capable telephone, or by a computer networked to the Internet-capable telephone. Further, such conversion may be an HTML-to-HTML conversion, for example as provided by a plug-in that operates in a connection with a conventional Web browser, such as Navigator, manufactured by Netscape Communications Corporation of Mountain View, California. Further, pattern recognition may be performed by the Client.

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Accordingly, the invention should only be limited by the Claims included below.